THE IMPACT OF LEVERAGE ON FIRM GROWTH. EMPIRICAL EVIDENCE FROM ROMANIAN LISTED FIRMS

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Abstract: *The aim of the paper is to assess the impact of leverage on firm growth in periods of economic growth and economic uncertainty. We employ a sample of Romanian listed firms over the period 2001-2011 and several alternative measures for firm growth (i.e. sales growth, assets growth, and employment growth). The results of fixed effects regression model show that the leverage has a positive effect on firm growth. Furthermore, profitability was found to positively influence the firm growth, while older firms saw a faster increase in assets and sales. Within this particular sample, firm size appears to constrain growth.*

Keywords: *Firm growth, financial structure, leverage, Romania, listed firms.*

JEL Classification: *G32, L25.*

1. INTRODUCTION

In Romania, leverage has risen sharply after 2000. According to data provide by the National Bank of Romania (Neagu et al., 2016), Romanian firms are financing their activity mainly using debt. The proportion of debt in total assets has increased from 20 % in 1994 to 63 % in 2014. Romanian firms have one of the highest leverage compared to other firms from Central and Eastern Europe (CEE) or from the Euro zone. For our panel data-set of listed Romanian firms we found an increase of leverage ratio from 11 % in 2001 to around 45 % in 2011. Despite this evolution, little is known about the effect of leverage on the dynamics of Romanian firms.

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Previous studies focused mostly on the effect of leverage on investment decisions (Botoc and Enache, 2013) and on the performance (Botoc, 2013; Mihai and Mihai, 2012; Vintila et al., 2014) of the Romanian listed firms. Another strand of the literature focused on the factors determining the Romanian firms' target capital structure and adjustment speed to the target capital structure (Nivorozhkin, 2005; Brendea, 2014). While there is no empirical evidence on the relationship between leverage and firm growth in Romania, this paper aims to fill this gap in literature by providing insights on this topic.

The aim of the paper is to investigate the impact of leverage on firm growth during periods of economic growth and also of economic uncertainty. Using a sample of Romanian listed firms over the period 2001-2011, we found that leverage has a positive effect on firm growth. We contribute to the extant literature in three ways. Firstly, we provide insights on the relationship between the firm financing and firm growth in a transition economy from CEE using a sample of listed firms. Secondly, contrary to most of the previous studies, we employ three alternative growth measures to test the robustness of our findings. Thirdly, by employing a longer period of analysis, we assess the impact of leverage on firm growth in different phases of the economic cycle.

The remainder of this paper is structured as follows. Section 2 briefly reviews the existing literature on the relationship between firm growth and financial structure in CEE countries. Section 3 presents the variables and methodology employed in the paper. Section 4 discusses the empirical results, while the last section concludes.

2. LITERATURE REVIEW

A plethora of theoretical and empirical papers found that firm value is strongly affected by its capital structure. Most of the previous studies focused either on firms from developed countries (Molinari *et al.*, 2016; Donati, 2016; Dimelis *et al.*, 2016) or small and medium sized enterprises (SMEs) (Chittenden *et al.*, 1996; Carpenter and Petersen, 2002; Honjo and Harada, 2006; Tsuruta, 2015).

A large group of studies (Heshmati, 2001; Honjo and Harada, 2006; Hermelo and Vassolo, 2007; Huynh and Petrunia, 2010)) has found a positive effect of leverage on firm growth (measured in absolute or relative terms, using

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different variables and time spans). Other studies (Lang et al., 1996) reported statistically significant negative effect of leverage on firm growth.

However, there are only few papers on this topic in the context of transition economies from CEE. Using a sample of firms operating in the Baltic countries (Estonia, Latvia, and Lithuania) over the period 2001-2008, Avama (2011) found a positive relationship between leverage and sales growth for local companies, while the impact of leverage on growth of multinational companies is insignificant. Mateev and Anastasov (2010) employed an extensive sample of 560 SMEs from 6 CEE countries (Bulgaria, Croatia, the Czech Republic, Poland, Romania, and Serbia) over the period 2001-2005 and found that leverage has a positive impact on sales growth.

To the best of our knowledge, there is no study on the relationship between leverage and firm growth on a sample of Romanian listed firms. Previous papers tested the effects of leverage on different financial decisions or on the profitability of Romanian listed firms. Using a sample of 67 firms listed on the Bucharest Stock Exchange, Botoc and Enache (2013) analysed the relationship between investment decisions, financial leverage, and growth opportunities. The authors found that higher debt has a negative effect on investment decisions. Botoc (2013) tested the effect of financial structure on the profitability of the Romanian listed firms over the period 2001-2011. The results showed that leverage negatively affects the profitability of the Romanian firms, which is consistent with the pecking order theory. Vintilă et al. (2014) confirmed the above mentioned findings by studying a sample of 40 Romanian listed firms over the period 2010-2012.

In order to test the relationship between leverage and firm growth, we use a sample of listed Romanian firms over the period 2001-2011 for several reasons. Firstly, previous studies have mostly focused on large firms or SMEs from developed economies. Secondly, following Botoc (2013), we have chosen to study listed firms given the reliability of their financial statements. Thirdly, Romanian firms have been subject to important financial constraints in the light of the latest global financial crisis, meaning that their growth may be affected by the lack of external financing. Fourthly, the Romanian listed firms are worthy of study because they operate in a banking-oriented financial system common in the European Union. The results may be of interest for other listed firms located in countries with similar financial systems, academics and policy makers. Knowing

the effects of debt on sales and job growth, shareholders and managers can adopt better financing and investment decisions. Public authorities, at local and central level, can elaborate better public policies aimed to support firm growth and, thus, job creation and economic growth.

3. DATA AND METHODOLOGY

Our analysis uses a sample of 63 Romanian firms listed on the Bucharest Stock Exchange. Financial data was manually collected from the firms' annual reports over the period 2001-2011. During this time span all the firms in the sample used the same accounting standard (i.e. Romanian Accounting Standard). The sample was restricted to the period 2001-2011 due to the fact that after 2011, listed firms in Romania were expected to use the International Financial Reporting Standards (IFRS). We excluded from our sample financial firms (banks and investment funds) as their financial structure is determined by other factors (e.g., high level of regulation), as well as firms with incomplete data. As a result of these restrictions, our final sample includes 571 firm year observations over the period 2001-2011.

The model is set up with the following specification:

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\begin{aligned}
FIRM\ GROWTH_{i,t} &= \beta_0 + \beta_1 * LEVE_{i,t-1} + \beta_2 * FIRM\ SIZE_{i,t-1} + \beta_3 \\
&\quad * AGE_{i,t-1} + \beta_4 * CURR\_RATIO_{i,t-1} + \beta_5 * ROA_{i,t-1} + \beta_6 \\
&\quad * FIN\_CONS_{i,t-1} + \beta_7 * INV\_OPP_{i,t-1} + u_i + \varepsilon_{i,t}
\end{aligned} \tag{1}
$$

where:
- FIRM GROWTH$_{i,t}$ denotes growth rate for firm i in year t (i= 1,…, N; t = 1,…, T) computed using three different firm-specific variables;
- LEVE, our independent variables of interest, measure the degree of indebtedness;
- FIRM SIZE, AGE, CURR_RATIO, ROA, FIN_CONS, and INV_OPP represent control variables for firm i at time $t;$
- $\beta_0, \beta_1, \ldots, \beta_7$ are parameters to be estimated;
- u_i are firm-specific fixed effects;
- $\varepsilon_{i,t}$ is an idiosyncratic disturbance term.

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Following Honjo and Harada (2006), in order to limit the potential endogeneity issues (i.e. reverse causality among variables) the firm-specific variables are lagged 1 year.

Variable selection was influenced by the existing empirical studies in the area (Honjo and Harada, 2006; Avarmaa, 2001; Kiani et al., 2012).

In order to test the robustness of our findings, we employ several alternative measures of firm growth: employment growth, sales growth, and total assets growth. Growth is measured as the logarithmic difference in the number of employees/sales/assets in two consecutive years. Most of the previous studies used only sales growth and/or employment growth as proxy for firm growth. Table 1 presents an overview of the dependent and independent variables employed in the models.

Table 1 *Variables description*

Variable	Abbreviation	Description
Dependent variables		
Employment growth	GR_ EMP	Log (no of employees$_{i,t}$) – log (no of employees$_{i,t-1}$)
Total assets growth	GR_ AS	Log (total assets$_{i,t}$) – log (total assets$_{i,t-1}$)
Sales growth	GR_ SA	Log (sales$_{i,t}$) – log (sales$_{i,t-1}$)
Independent variables		
Leverage	LEVE	Total liabilities/Total assets
Firm size 1. Number of employees 2. Total assets 3. Sales	EMP TA SA	1. Log of number of employees 2. Log of total assets 3. Log of sales
Firm age	AGE	Log of firm age
Current ratio	CURR_RATIO	Current assets/Current liabilities
Return on assets	ROA	Earnings before taxes (EBT)/Total assets
Financial constraints (dummy variable)	FIN_CONS	1 if the firm paid a dividend in the current year and 0 otherwise.
Investment opportunities	INV_OPP	Capital expenditures over total sales

Following Rajan and Zingales (1995), we compute leverage as the ratio of total liabilities to total assets. This broad definition has two main advantages: (1) it recognizes trade credit as a short term financing source and (2) it is available for all firms.

As firm-specific explanatory variables which could impact firm growth we employ firm size, age, current ratio, profitability, financial constraints, and investment opportunities. Firm size is measured alternatively by the number of employees, sales, or total assets.

Several theoretical papers (Demirguc-Kunt and Maksimovic (1998); Gulati and Zantout (1997)) argue that (previous year(s)) firm profitability is an important determinant of the firm growth. Numerous papers have used ROA and/or ROE as explanatory variables in firm growth models.

As already highlighted by Dinh et al. (2010), access to finance is the most binding constraint for firm growth in developing countries. To capture the effects of financial constraints on firm growth, we employ a dividend dummy that will take value 1, if the firm paid dividends in the current year, and 0 otherwise.

From the previous empirical evidence, we posit the following research hypotheses:

H1: Leverage is positively associated with firm growth.

H2: Firm size and firm growth are negatively related.

Due to the fact that our sample includes observations of 63 non-financial firms over 11 years, panel data analysis techniques can be used. The panel regression analysis has the advantage of controlling for unobservable firm characteristics and also for missing values which may influence firm growth (Brooks, 2008).

4. EMPIRICAL RESULTS

Table 2 shows the descriptive statistics for the full unbalanced panel dataset with 63 firms and 571 observations. Outliers have been eliminated by winsorizing observations in the top and bottom 1 percentile. The dependent variables display a wide variation across firms and over time. In Table 2, the means of GR_AS and GR_SA are approximately 13.1 % and 8.4 %. On average, firm growth increases when we use assets growth and sales growth as proxies. These results correspond to the expansion phase recorded by the Romanian economy during the period 2001-2008. The average growth in

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negative (-0.077) when we use the number of employees to measure growth. The mean value for leverage (0.407) is in line with other previously reported values for Romanian listed firms (Botoc, 2013; Brendea, 2014).

Table 2 *Descriptive statistics*

Variable	Mean	S. D.	Minimum	Maximum	Obs.
GR_EMP	-0.077	0.263	-2.913	1.407	571
GR_AS	0.131	0.306	-1.827	2.322	571
GR_SA	0.084	0.404	-2.449	3.109	571
LEVE	0.407	0.268	0.000	1.774	571
EMP	6.489	1.235	2.639	11.057	571
TA	11.737	1.533	8.290	17.337	571
SALES	11.417	1.548	6.573	16.634	571
AGE	3.351	0.679	0.693	4.727	571
CURR_RATIO	2.168	2.623	0.160	28.962	571
ROA	3.255	10.423	-65.454	82.257	571
FIN_CONS	0.284	0.451	0.000	1.000	571
INVOPP	0.030	0.052	-0.044	0.480	571

Before running the models, we conducted several tests. First, we tested for correlation across variables. Table A1 (see Appendix) presents the correlation matrix of dependent and independent variables. We notice a low level of correlation among the dependent variables – various measures of firm growth that will be used later on alternatively in the models. As the correlation among independent variable is moderate, we consider that multicoliniarity is unlikely to be a problem in our models.

To choose between fixed-effects model and random-effects model we used the Hausman test. We tested the following hypotheses: H_0 = random effects and H_1 = fixed effects. According to the results (Table 3), H_0 is rejected ($p < 0.0001$), meaning that the fixed effects specification is to be preferred. The advantage of fixed effects panel data model is that it controls for time-invariant, firm-specific characteristics that affect firm growth, but are not captured by firm-level control variables.

Table 3 *Results for the Hausman test*

Correlated Random Effects - Hausman Test Equation: EQ01 (GR_EM dependent variable) Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	18.080144	7	0.0000

Equation: EQ02 (GR_AS dependent variable)			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	68.165037	7	0.0000
Equation: EQ03 (GR_SA dependent variable)			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	115.083557	7	0.0000

As already mentioned, in order to investigate the effect of leverage on different measures of firm growth, we employ three models. Table 4 reports the results of the fixed effects models. The first model (column two) uses employment growth as dependent variable. The second model (column three) employs total assets growth, while the third model (column four) uses sales growth as proxy for firm growth.

Table 4 *Impact of leverage on firm growth (2001-2011)*

Variables (1)	Model 1-GR_EMP (2)	Model 2 – GR_AS (3)	Model 3 –GR_SA (4)
C	1.462761 (0.387130)	1.646042 (0.336371)	3.889618 (0.475439)
LEVE (-1)	0.168640** (0.080576)	0.207149** (0.091033)	0.291686** (0.124412)
EMP (-1)	-0.108878*** (0.032835)	-	-
TA (-1)	-	-0.215446*** (0.026114)	-
SALES (-1)	-	-	-0.385029*** (0.038140)
AGE (-1)	-0.269079*** (0.087136)	0.273316** (0.115807)	0.133025* (0.146493)
CURR_RATIO (-1)	-0.004133 (0.006937)	-0.003293 (0.007800)	-0.001270 (0.010466)
ROA (-1)	0.002712** (0.001357)	0.004611*** (0.001528)	0.005544*** (0.002098)
FIN_CONS (-1)	0.084532** (0.033784)	-0.003038 (0.037976)	0.017878 (0.050855)
INVOPP (-1)	-0.937815*** (0.309742)	-0.412381 (0.344234)	-0.482547 (0.460862)
R-squared	0.263360	0.289292	0.289894
Adjusted R-squared	0.154287	0.184954	0.185644
Total panel (unbalanced) observations	536	540	540

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Standard error in parentheses

*** p < 0.01, ** p < 0.05, * p < 0.1

In all models, our results show a positive effect of leverage on firm growth. Hypothesis 1 is accepted at a significance level of 5 %. Our results confirm the findings of the previous studies focused on firms operating in developed countries (Honjo and Harada, 2006; Huynh and Petrunia, 2010). As the local capital market is still underdeveloped, Romanian firms from our sample can develop their business only if they are able to obtain debt financing. This issue is common for other firms operating in CEE countries (Avarmaa, 2011).

We also found a negative relationship between firm size and firm growth. Hypothesis 2 is accepted on our sample at a significance level of 1 %. Our results suggest that Gibrat's law (or Law of Proportional Effect) does not hold in this sample of firms.

The relationship between firm age and growth is significant statistically in all three models, but the signs are mixed. On the one hand, age has a negative effect on the employment growth, suggesting that young firms are likely to hire more people. On the other hand, age is positively related to sales and total assets growth. These results indicate that older firms are likely to increase faster their assets and sales.

Our results show a positive relationship between ROA and firm growth, suggesting that firm growth in Romania is financed by increasing firm profitability. All other firm-level variables (financial constraints, investment opportunities, and current ratio) are not statistically significant in all three models.

In order to test the robustness of our findings, we winsorize all the observations with leverage above 1. We ran again the models and the results (available upon request) remained broadly consistent with the previous findings.

5. CONCLUSIONS

The aim of the paper is to assess the effect of leverage on firm growth on a sample of Romanian non-financial firms listed on the Bucharest Stock Exchange. As firm specific variables that can influence firm growth, we employ firm size, age, current ratio, return on assets, financial constraints, and investment opportunities.

Using a fixed effects regression model on firm level data over the period 2001-2011, we found that leverage exerts a positive effect on firm growth. According to our models, highly leveraged firms grow faster as lower leveraged firms during the period examined. Our results stand for various measures of firm growth (i.e. sales growth, assets growth, and employment growth).

Estimation results suggest a statistically significant relationship between firm size and firm growth. Larger firms grow slower, while smaller firms grow faster. Moreover, we found that profitability positively influences firm growth and older firms increase faster their assets and sales.

This study presents some limitations. Firstly, as most of the previous studies, we consider total growth (i.e., the sum of organic and acquired growth,) without taking into account mergers and acquisitions given the lack of information on this topic. Secondly, as only listed firms are included in our analysis, the findings cannot be generalized to all Romanian firms.

REFERENCES

1. Avarmaa, M., "Does Leverage Affect Company Growth in the Baltic Countries?", 2011 International Conference on Information and Finance (IPEDR), vol.21, 2011, IACSIT Press, Singapore, pp. 90-95.
2. Botoc, C, Enache, C., Underinvestment Problem: Romanian Evidence, Annales Universitatis Apulensis Series Oeconomica, 15(2), 2013, 552-560.
3. Boţoc C., 2013. Profitability - Capital Structure trade off: case of publicly Romanian companies, The Annals of The University of Oradea, Economic Sciences, Tom XXII, 1, 409-415.
4. Brendea, G., Financing Behavior of Romanian Listed Firms in Adjusting to the Target Capital Structure, *Finance a úvěr-Czech Journal of Economics and Finance*, 64, 2014, no. 4, pp. 312-329.
5. Brooks, C. (2008), Introductory Econometrics for Finance, Second Edition, Cambridge University Press, Cambridge.
6. Carpenter, R.E. and Petersen, B.C., Is the growth of small firms constrained by internal finance? Review of Economics and Statistics, 2002, 84, 298–309.
7. Chittenden, F., Hall, G. and Hutchinson, P., Small firm growth, access to capital markets and financial structure: Review of issues and an empirical observation. Small Business Economics, 1996, 8(1), 59–67.
8. Demirguc-Kunt, A. and Maksimovic, V., Law, finance, and firm growth. Journal of Finance, 1998, 53, 2107–2137.
9. Dimelis, S., Giotopoulos, I. & Louri, H., 2016, "Can Firms Grow Without Credit? A Quantile Panel Analysis in the Euro Area", Journal of Industry, Competition and Trade, doi:10.1007/s10842-016-0216-1.

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10. Dinh, H., Mavridis, D., Nguyen, H., "The Binding Constraint on Firms' Growth in Developing Countries", *The World Bank. Policy Research Working Paper.* 2010, 5485.

11. Donati, C. (2016), Firm growth and liquidity constraints: evidence from the manufacturing and service sectors in Italy, Applied Economics, 48:20, 1881-1892, DOI: 10.1080/00036846.2015.1109044.

12. Gulati, D. and Zantout, Z., Inflation, capital structure, and immunization of the firm's growth potential. Journal of Financial and Strategic Decisions, 1997, 10(1), 77–90.

13. Honjo, Y. & Harada, N., "SME Policy, Financial Structure and Firm Growth: Evidence from Japan", Small Business Economics (2006) 27: 289–300, DOI 10.1007/s11187-005-6703-0.

14. Hermelo, F., Vassolo, R., The Determinants of Firm's Growth: an Empirical Examination. *Revista Abante*. 2007, 10(1): 3-20.

15. Heshmati, H., On the Growth of Micro and Small Firms: Evidence from Sweden. *Small Business Economics. 2001*, 17 (3): 213-228.

16. Huynh, K., Petrunia, R., Age effects, leverage and firm growth. *Journal of Economic Dynamics & Control*. 2010, 34(5): 1003-1013.

17. Kiani, K.M., Chen, E. H. & Madjd-Sadjadi, Z. (2012), "Financial factors and firm growth: evidence from financial data on Taiwanese firms", *Quantitative Finance*, 12:8, 1299-1314, DOI: 10.1080/14697688.2011.556143

18. Lang, L., E. Ofek and R. M. Stulz, 1996, Leverage, Investment, and Firm Growth, Journal of Financial Economics 40, 3–29.

19. Mateev, M. Anastasov, Y., "Determinants of small and medium sized fast growing enterprises in Central and Eastern Europe: A panel data analysis, Financial Theory and Practice, 2010, 34 (3), pp. 269-295.

20. Molinari, M., Giannangeli, S. and Fagiolo, G. (2016), Financial Structure and Corporate Growth: Evidence from Italian Panel Data. Economic Notes, 45: 303–325. doi:10.1111/ecno.12059.

21. Mihai I.O., C. Mihai (2012), "Ultimate Owner and Firm Performance - Evidence from Romanian Mining and Quarrying Listed Firms", Annals of "Dunarea de Jos" University of Galati, Economics and Applied Informatics, no. 2.

22. Neagu, F., Dragu, F., Costeiu, A., 2016, "După 20 de ani: schimbări structurale în economia României în primele decenii postdecembriste", Banca Naţională a României, Caiete de studii Nr. 42.

23. Nivorozhkin E (2005): Financing choices of firms in EU accession countries. Emerging Markets Review, 6:138–169.

24. Rajan, R. G. and Zingales, L. (1995), What Do We Know about Capital Structure? Some Evidence from International Data. The Journal of Finance, 50: 1421–1460. doi:10.1111/j.1540-6261.1995.tb05184.x.

25. Tsuruta, D., Leverage and firm performance of small businesses: evidence from Japan, Small Business Economics (2015) 44:385–410, DOI 10.1007/s11187-014-9601-5.

26. Vintilă, G., Nenu, E. A., Gherghina, S.C., Empirical Research towards the Factors Influencing Corporate Financial Performance on the Bucharest Stock Exchange, Scientific Annals of the "Alexandru Ioan Cuza" University of Iaşi Economic Sciences 61 (2), 2014, pp. 219-233. DOI 10.2478/aicue-2014-0009.

APPENDIX 1.

Tables A1 *Correlation matrix of variables*

	GR_EMP	GR_AS	GR_SA	LEVE	EMP	TA	SALES	AGE	CURR_RATIO	ROA	FIN_CONS	INVOPP
GR_EMP	1											
GR_AS	0.263	1										
GR_SA	0.432	0.256	1									
LEVE	0.044	-0.092	0.065	1								
EMP	0.214	0.027	0.086	0.099	1							
TA	0.034	0.040	-0.001	0.092	0.638	1						
SALES	0.128	0.002	0.175	0.240	0.699	0.880	1					
AGE	-0.101	-0.093	-0.049	-0.024	-0.113	-0.135	-0.111	1				
CURR_RATIO	-0.087	-0.006	-0.063	-0.445	-0.212	-0.085	-0.204	-0.007	1			
ROA	0.193	0.159	0.180	-0.410	0.011	-0.092	-0.007	-0.050	0.137	1		
FIN_CONS	0.104	0.017	0.063	-0.230	0.151	0.117	0.171	-0.055	0.059	0.325	1	
INVOPP	-0.152	-0.182	-0.152	-0.122	-0.010	0.260	0.066	-0.107	0.165	-0.060	0.063	1

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